INFORMATION NEEDS TO ENABLE REVIEW OF EPA'S REVISED FS SECTIONS 3 AND 4

1. Please provide the technical memoranda, communications, and other documentation that details EPA's methods for deriving PTW highly toxic thresholds. EPA referred, at the July 29, 2015 roll-out meeting, to a 2014 EPA Technical Memorandum for these methods. That memorandum was stamped preliminary draft and contains multiple other methods that EPA appears to have abandoned or revised in the interim. Please provide the memoranda and other documents that address or explain which methods were considered, which were adopted, which were rejected and why they were adopted or rejected.
2. The technology assignment scoring matrix (Figure 3.3-14b) is presented as applying to the entire Site with only a couple of "off ramps" to the process identified (Figure 3.3-14a). Examination of the decision trees (Figures 3.6-01a-c) for shallow, intermediate, and Navigation Channel/Future Maintenance Dredge areas show that the scoring matrix is only used and applied in the intermediate areas (which constitute a fraction of the Site). Please provide the memoranda, communications, and other documents that address or explain the relationship between the technology assignment scoring matrix, each of the three decision trees, and any additional steps taken to select technologies for alternatives.
3. EPA states in Section 3.3.2.3 that there are instances when an area does not receive a technology score (an outcome when the areas does not achieve a threshold for any of the criteria). Please provide the technical memoranda, communications, and other documents that address or explain what technology is assumed for those areas?
4. Section 3.3.2 discusses a two-step process for applying technologies. "The second step transforms segmented and isolated pixel-level technology assignments (resulting from a strict interpretation of the GIS output) to a predominant technology assignment by applying a smoothing algorithm that eliminates some of the small scale variability in the output and assigns a technology to the majority of the pixels within each SMA." Please provide the memoranda, communications, and other documents that address or explain the origin and details of the "smoothing algorithm" and how it was or was not employed in EPA's FS.
5. Please provide the memoranda, communications, and other documents that address or explain the details of how groundwater plume areas were identified. Please also provide the maps showing resulting plume areas as referenced on the technology decision trees for shallow and intermediate areas (Figure 3.6-01b and c).
6. Please provide the maps and other documents that identify the location of the actual erosion areas identified by EPA based on sheer stress.
7. Please provide the technical memoranda, communications, and other documents that address or explain EPA's rationale for using the 0.5 surface to subsurface sediment chemical concentration ratio for evaluation of natural recovery at the site.
8. Please provide the technical memoranda, communications, and other documents that address or explain how different types of PTW (NAPL, not reliably contained, high concentration) are assigned technologies and disposal requirements. For example, the

sediment and soil disposal decision tree framework presented in Figure 3.3-40 does not identify a treatment step for "PTW that cannot be reliably contained", and provides an option for the waste to be disposed in either Subtitle C or D. However, the Section 4 text for each alternative states that such removed PTW is assumed to undergo ex situ treatment. (For example see Section 4.2.2.4 Reduction of Toxicity, Mobility or Volume.) Figure 3.3-40 also indicates that treatment is required for PTW containing source material, PAHs or DDx, but that after treatment the waste can be disposed in Subtitle C or D or even the CDF depending on a number of factors. Section 4.3.4 text states "All PTW treated ex-situ in Alternatives B through G is assumed to be disposed at a RCRA Subtitle C facility." Please provide the technical memoranda, communications, and other documents that address or explain the discrepancy between these two PTW disposal decision trees.

9. Please provide any maps showing the different types of PTW identified (i.e., "not reliably contained", high concentration, NAPL, "source material", "highly mobile") and maps, documents, memoranda, or other communications that address or identify the technologies and disposal requirements assumed in each area of identified PTW.

10. Regarding PTW determinations, Table 3.3-7 notes that only chlorobenzene and naphthalene "cannot be reliably contained". However, page 3-21 says PCBs and dioxins/furans can be reliably contained, but "an additional evaluation will need to be conducted on dredged sediment containing any PTW related to NAPL, PAHs or DDx. Thus, ex-situ treatment is applied to dredged sediment and soil containing these contaminants." Please provide the technical memoranda, communications, and other documents that address or explain the rationale for conducting a detailed PTW "reliably contained" analysis and then not applying the results to NAPL, PAHs, and DDx materials. The cost appendix appears to focus on NAPL and "not reliably contained material" for ex situ treatment and subtitle C disposal. Please provide the memoranda, cost information, communications, and other documents that address, show, or explain whether PAH and DDx high concentration material was assumed to receive ex situ treatment or not.

11. EPA indicates on page 3-24 that a review of chemical concentrations (particularly metals) across the Site indicated the potential for additional sediments to be classified as characteristic hazardous wastes based on the RCRA toxicity criteria. This review is not explained further in Section 3. In Section 4 a separate discussion on RCRA implies that some areas were assumed to be RCRA hazardous waste, but this discussion is not tied back to the Section 3 discussion of RCRA or alternative development. Please provide the technical memoranda, communications, and other documents that address or explain:

    a. Which approach to RCRA waste determination (Section 3 or Section 4) was used to develop the alternatives.
    b. How the review described in Section 3 was performed.
    c. How this "review" related to the information presented in Section 4.
    d. Which samples and locations exceeded RCRA toxicity criteria and for what chemicals (i.e., the tables which contained the information used to develop the maps in EPA's FS).

e. Whether the Section 3 alternative quantities and Section 4 alternative costs assume that all removed sediments within the LDR-exceedance boundaries identified in Figures 4.2-13a-d and Figure 4.2-2d undergo ex situ treatment (i.e., incineration per LDR) followed by Subtitle C disposal?
f. What are the quantities and costs associated with handling and disposal of assumed RCRA hazardous waste presented either in the main text or the cost appendix?
g. The locations for, including maps showing, disposal and treatment requirements for all areas of assumed RCRA hazardous waste.
h. Why certain areas were assumed to have sediments that would be required to be treated as RCRA hazardous waste, and what those disposal and treatment assumptions used for these situations.

12. Footnote 3 in the sediment and soil disposal decision tree framework presented in Figure 3.3-40 states "Sediment adjacent to and down river of the Arkema site contains DDT-manufacturing waste residue and if this material is taken off-site for disposal, it becomes subject to the Oregon Pesticide Residue Rule (Oregon Administrative Rule 340-109)." Please provide the technical memoranda, communications, and other documents that address, show, or explain:
    a. What areas and specific volumes of the removed material with detections of DDx compounds down river of Arkema were used in EPA's Section 4 cost estimates, and what was assumed to be subject to the Oregon Pesticide Residue Rule?
    b. What proportion of these materials EPA assumed would require Subtitle C versus Subtitle D disposal based on the "contained in" decision point identified in the soil disposal decision tree framework presented in Figure 3.3-40?
13. Please provide the technical memoranda, l communications, and other documents that address or explain EPA's selection of thermal desorption as the representative ex situ treatment option (e.g., as compared to solidification/stabilization).
14. Please provide the technical memoranda, communications, and other documents that address, describe, or explain EPA's methods and site data used for defining NAPL in the cores shown in Figures 3.3-28 and 29. (e.g., EPA's Gasco figure does not match the Gasco EE/CA figures).
15. Please provide the technical memoranda, communications, and other documents that address or explain:
    a. Why EPA shows a smaller scale RAL curve for DDx only.
    b. Why so called "Site-wide" RAL curves range in acreage covered from 2,200 acres to 180 acres.
16. Please provide the technical memoranda, communications, and other documents that address or identify whether any other smaller spatial scale (not Site-wide) RAL curves were developed for any of the RAL COCs, including copies of any such curves that were developed, and why such curves were not included in EPA's FS.

17. Please provide the technical memoranda, communications, and other documents that address or explain where "background" replacement values for Dioxin/Furan RAL curves come from, how they were developed, and why are they appropriate.
18. Please provide the technical memoranda, communications, and other documents that address or explain why the MDL replacement value is used for the PeCDD RAL curve but background concentrations are used for other RAL curves and/or how a particular MDL was selected from the multiple MDL's in the project database.
19. Please provide the technical memoranda, communications, and other documents that address or explain the derivation of the 970 ppb PRG used to generate the TPAH RAL curve shown in Figure 3.3-2 and any other information on the use of TPAH RALs to evaluate alternatives for addressing cPAH risk.
20. From Figure 4.2-11, EPA appears to have used bioassays (in some way) and LRM (in some way) to determine the presence of benthic risk, which is described as "toxicity points" in the Section 4 text. Please provide the technical memoranda, communications, and other documents that address or explain how a "toxicity point" was determined from the benthic toxicity LOEs in general.
21. Please provide the technical maps, memoranda, communications, and other documents that address, show, or explain the lengths and locations of riverbank remediation that have been included in each remedial alternative analyzed in EPA's FS.
22. Please provide the maps, technical memoranda, communications, and other documents that address, explain, or show Cross-section schematic(s) of assumed riverbank remediation designs (i.e., one schematic for each different type of design assumption, if more than one assumption exists) including assumed existing and required slopes and integration into sediment remedy.
23. Please provide the maps, technical memoranda, communications, and other documents that address, show, or explain where on the various riverbanks that "beach mix" vs. "vegetation" (p.3-35) was assumed to be applied.
24. Please provide all riverbank data (in Access or Excel format) used in the riverbank evaluation and the technical memoranda, communications, and other documents that address or explain EPA's quality or validation evaluation steps for those data.
25. Please provide the maps, technical memoranda, communications, and other documents that address, explain, or are related to EPA's sheetpile approach, including:
    a. Any schematics showing the area enclosed, the linear feet of sheetpiles, and the assumed height of the sheetpiles;
    b. Descriptions of the sheetpiling proposed;
    c. Assessments of the feasibility of construction of unsupported sheetpiles in water in excess of 40 feet deep;
    d. Identification and description of the NAPL areas that would be enclosed and those which would not. Note that EPA indicates that NAPL areas would be enclosed by sheetpile, but that some NAPL areas may be capped (if we understand EPA's technology assignment approach correctly).

26. EPA indicates that "maximum contaminant concentrations in sediment suitable for placement in the CDF were derived in the T4 60 Percent Design (Anchor QEA 2011), and are provided in Appendix D." However, Appendix D exclusively presents cap modeling methods and results used to identify PTW that is not reliably contained. Please provide the technical memoranda, communications, and other documents that address or explain:
    a. Whether EPA is indicating that this same modeling approach for the PTW evaluation was used to determine materials that can be placed in a CDF;
    b. What are the maximum contaminant concentrations in sediment suitable for placement in the CDF;
    c. The rationale for why some of the CDF criteria were changed from T4 60% design (e.g., "without adequate treatment" was removed, "NAPL" was added to no free oil criterion, and a new criterion for "Waste or Contaminated Media Warranting Additional Management was added);
    d. How EPA reached its assumptions or conclusions about the CDF for the FS.
27. A number of figures that provided detailed information on a site-wide basis do not display well when zooming in to look at individual SMAs. These figures are listed below. Please provide GIS files for the figures listed below or pdf versions with higher resolution:
    a. Figure 3.2-03_PTW-Concentrations.pdf
    b. Figure 3.3-13_SMAs_REV 2.pdf
    c. Figure 3.3-20_Surface-Subsurface-Sed-Ratios.pdf
    d. Figure 3.3-27a through f_Matrix-Tech-Assign
    e. Figure 3.3-28_Arkema-NAPL-PTW.pdf
    f. Figure 3.3-29_Gasco_NAPL-PTW.pdf
    g. Figure 3.6-02 through 07 Tech-Assign-Alt B through F
28. Please provide the technical memoranda, communications, and other documents that address, support, or explain EPA's construction duration assumptions for non-dredging related activities (e.g., time for moving and maintaining dredges, capping, placement of backfill, EMNR, in-situ treatment materials, building of CDFs, placement/removal of sheet piles etc.).
29. EPA presented SEDCAM modeling results during the July 31st "roll-out" meeting that showed long term sediment estimates. Those results were not included in Section 4. Please provide the technical memoranda, communications, and other documents that address, support, document, or explain those results, including the recovery curves shown at the meeting. Please also provide the technical memoranda, communications, and other documents that address, describe, support, or explain the modeling methods.

30. Please provide the technical memoranda, communications, and other documents that address, describe, support, or explain the import volumes, and assumptions about backfill volumes, in Table 3.6-3.
31. Please provide the missing references for Section 4.
32. Please provide the technical memoranda, communications, and other documents that address, document, or explain how risk calculations for residual risk assessment were performed and how residual risk estimates were generated. (Note that this information was not included in EPA's Appendix H, which only includes methods for calculating time-zero SWACs.)
33. Page 4-8 indicates "While some residual risk figures are presented in this section, all the residual risk figures are provided in Appendix H." Unfortunately, this assertion appears to be inaccurate. No such figures are provided in Appendix H. Please provide the technical memoranda, communications, and other documents that address, document, or explain the residual risk figures provided, and any additional residual risk figures that are not included in EPA's FS.
34. Page 4-1 indicates "Site-wide and smaller spatial scales were used to understand the effects of the alternatives in reaching the RAOs." Please provide the technical memoranda, communications, and other documents that address, document, or explain the residual risk estimates made on a Site-wide basis.
35. Please provide technical memoranda, communications, and other documents that address, document, or explain which fish consumption scenario is being presented in the RAO 2 residual risk figures?
36. The text on page 4-6 indicates that EPA calculated tissue concentrations from SWAC estimates, but no tissue concentrations are presented. The text also indicates that these estimated tissue concentrations were compared to the PRGs for RAO 2. Please provide the technical memoranda, communications or other documents that address, document, or explain these analyses and the comparisons?
37. EPA indicates (p. 4-3) "While the physical CSM emphasizes the importance of bedload transport indicating that about half the sediment load into the site occurs from bedload transport, the HST model does not include this transport process." Please provide the technical memoranda, communications or other documents that address, document, or explain the CSM that EPA is referring to that discusses the amount of bedload transport expected and the reasons for the conclusions contained in that CSM referred to on p. 4-3. (Please note that FS Section 1 does not contain a CSM description that addresses this issue.)
38. It is difficult to determine areas and quantities that EPA determined for each outcome indicated in the technology decision trees (Figures 3.6-01a-c and Figure 3.3-40). Please provide the technical memoranda, communications, and other documents that address, document, or explain the quantities for each alternative (including acreages for capping, EMNR, in-situ treatment, etc. and volumes for dredging, ex-situ treatment, and disposal options resulting from the application of the technology decision trees.) Please also provide any maps (and GIS files) that show where each detailed technology or

combination of technologies indicated in the decision trees is applied to each different sub-area or pixel. Currently the maps in Section 3 and 4 only show generalized areas of EMNR, In-situ treatment, capping, dredging and dredge/capping. Examples of additional technology assumptions discussed in EPA's FS but not shown on the maps in EPA's FS include (but may not be limited to):

a. Reactive armored cap
b. Armored cap
c. Reactive cap
d. Engineered cap
e. Dredge to DOCR/reactive residual layer
f. Dredge to DOCR/reactive residual and backfill
g. Dredge to 15 ft/significantly augmented reactive cap
h. Dredge to 15 ft/significantly augmented reactive cap and backfill
i. Dredge to 15 ft/reactive residual layer
j. Dredge to 15ft/residual layer
k. Dredge to 3 ft/Reactive armored cap
l. Dredge to DOCR and backfill
m. Dredge to DOCR/residual layer
n. Dredge to 3ft/reactive engineered cap
o. Dredge to 3 ft/engineered cap
p. Dredge to depth of PTW/reactive residual layer
q. Upland D disposal
r. Upland C disposal without ex-situ treatment
s. Upland D disposal after ex-situ treatment
t. Upland C disposal after ex-situ treatment

Please provide the technical memoranda, communications, and other documents, including maps, that address, document, or explain the subsequent (assumed) steps for any removed material. Please provide the technical memoranda, communications, and other documents, including maps, that address, document, or explain the areas, quantities and technologies assigned for each outcome or location. Thus, in dredging areas, the documentation necessary to define which areas are assumed to be ex-situ treated and disposed of at Subtitle C or D or CDF facilities directly or after ex-situ treatment.

39. The cost estimates for each alternative are presented on a Site-wide basis only, with no spatial differentiation within the Site. The information contained in EPA's FS does not permit us to determine the subareas (such as SMAs or SDUs) within the Site from which quantities or costs originate. Please provide the technical memoranda, communications, or other documents that address, document, or explain, on a disaggregated basis, EPA's cost information as it was broken down by the smallest spatial scale (e.g. pixel by pixel) used to identify quantities and costs for the alternatives.

40. Please provide the technical memoranda, communications, and other documents that address, document, or explain why some of the Section 4 dioxin/furan PRGs differ from the Section 2 dioxin/furan PRGs. We need this information to understand EPS's proposed dioxin/furan PRGs.

41. For the RAO 1 residual risk assessment, the main text indicates that SWACs were generated on a 0.5 RM basis. Appendix H indicates a 1 river mile basis. Please provide the technical memoranda, communications, or other documents that address, document, or explain this component of EPA's residual risk assessment and that would enable us to determine which is correct.
42. Figure 4.2-1 indicates that risks in the navigation channel were assessed for RAO 1 (the text indicates is not applicable to RAO 1). Please clarify that EPA is not applying RAO 1 in the navigation channel, and provide the technical memoranda, communications, and other documents that address, document, or explain EPA's rationale for applying RAO 1 in the navigation channel. Please also provide the technical memoranda, communications, or other documents that address, document, or explain EPA's apparent use of the value of 210,000 highest non-cancer risk for a breastfeeding infant for Alternative A.

REQUESTS FOR CORRECTED INFORMATION

1. Figures 3.3-27 and 3.6-02 through 07 show different technology assignments in a number of intermediate to shallow areas throughout the Site. EPA indicated verbally on August 13th that the Section 3.6 figures were incorrect, and the Section 4 figures (Figure 4.2-11 and 4.2-14 through 4.2-17) also appear to match the incorrect Section 3.6 Figures (e.g. river mile 6.5E). Corrected versions of these figures are requested.
2. Differences in Sections 3 and 4 costs, areas, volumes, and durations are different in various tables and text. Please supply the correct values. Examples of inconsistencies were provided in an August 14th memo from the LWG.
3. EPA indicates in the text for shallow areas that, "Contaminated sediment will be dredged to the lesser of the RAL concentrations or a maximum depth of 5 feet, and the dredged material will be replaced with an engineered cap to previous elevation. Otherwise, the contaminated sediment will be dredged 3 feet and replaced with an engineered cap." However, the shallow area decision tree figure shows that for the "otherwise" step that areas dredged to 3 feet that are not PTW that is not reliably contained might be assigned either an engineered cap or a reactive cap depending on whether they are in a groundwater plume area. Which is correct?
4. For a breastfeeding infant, the highest hazard quotients for dioxin/furan TEQ calculated in the BHHRA were 10 on a Site-wide basis (tribal fish consumption, whole body diet) and 10 on a river-mile basis (recreational RME consumption, RM 7). Figure 4.2-4c(1) indicates that the HQ from HxCDF alone (not the entire TEQ) is more than 14,000 for Alternative A. For a child, the highest hazard quotients for dioxin/furan TEQ calculated in the BHHRA were also 10 on a Site-wide basis (tribal fish consumption, whole body diet) and 10 on a river-mile basis (recreational RME consumption, RM 7). Figure 4.2-3f(1) shows a HQ greater than 30 for just HxCDF. Are these values and figures correct? If not, please supply the correct information.
5. Figures 3.3-27 and 3.6-02 through 07 show remediation areas downstream of RM 1.9. This is inconsistent with Section 1 which states: "This FS focuses on approximately ten

miles of the lower Willamette River from River Mile (RM) 1.9 (at the upriver end of the Port of Portland's Terminal 5) to RM 11.8 (near the Broadway Bridge), sometimes referred to as the "site" in this FS for convenience." It is unclear if this is an error in the mapping only or carries through to assignments of technologies and various alternative quantity estimates. For example, Table 3.7-2 shows a total Site area (when the MNR and constructed areas are added together) of about 2,450 acres, which is larger than the Site area defined in Section 1 of EPA's revised FS (i.e., approximately 2,200 acres). This may be an unrelated inconsistency. Can EPA explain the inconsistencies? Are areas shown on the Section 3 figures included in Table 3.7-2 or other summary tables? Is EPA planning on correcting the total acreage of the Site? If so, please provide the correct information.

6. Two sentences in Section 3.3.2.1 contradict themselves: "Separate NPL sites within the Portland Harbor Site, Gould and McCormick and Baxter, where a final remedy has been implemented have been excluded from this analysis. This exclusion applies solely to the McCormick and Baxter site where the cleanup action included placement of a sediment cap." Please indicate whether Gould is included or not.